Snap-on BC4200B Fast 420 Battery Charger User's Manual

IMPORTANT SAFETY INSTRUCTIONS

This manual contains important safety and operating instructions for ***Snap-on*** Fast 420 Battery Charger model BC4200B. Refer to this manual often for information on safe operation.

Product Number	**Description**
BC4200B	Red battery charger
BC4200BGY	Grey battery charger
BC4200BPC	Black battery charger
BC4200BPF	Teal battery charger
BC4200BPM	Berry battery charger
BC4200BPQ	Yellow battery charger

Read All Instructions

Read, understand and follow all safety messages and instructions in this manual and on the test equipment. Safety messages in this section of the manual contain a signal word, a three-part message, and, in some instances, an icon.

The signal word indicates the level of hazard in a situation:

- Danger indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury to the operator or bystanders.
- Warning indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury to the operator or bystanders.

The three-part message uses three different type styles to further define the potential hazard.

- Normal type states the hazard.
- **Bold type** states how to avoid the hazard.
- *Italic type* states the possible consequences of not avoiding the hazard.

An icon, when present, gives a graphical description of the potential hazard.

SAVE THESE INSTRUCTIONS

Battery Gases, Charging Preparation and Charger Location

Risk of explosion. Gases produced by a battery are highly explosive.

- **Wear safety goggles and protective clothing, user and bystander.**
- **Use charger in an area having at least 4 air changes per hour.**
- **Read, understand and follow all instructions for charger, battery, vehicle and any equipment used near battery and charger.**
- **Do not obstruct vents on charger housing.**
- **Do not smoke, strike a match, place metal tools on battery or cause a spark in the vicinity of the battery. When removing battery cables, remove ground cable first.**
- **Clean terminals before charging battery. During cleaning, keep airborne corrosion from eyes, nose and mouth. Use baking soda and water to neutralize acid and help eliminate airborne corrosion.**
- **Never allow clamps on charger cables to touch each other.**
- **Do not expose charger to rain, snow or wet conditions.**
- **Do not allow battery gasses or acid to contact charger cabinet. Do not place charger directly above or below battery.**
- **Fill battery to level specified by battery manufacturer using distilled water.**
- **Remove or do not remove cell caps while charging per manufacturer's instructions.**
- **Make sure charger cable clamps make tight connections.**

Battery explosion can cause injury.

Acid Burns

Battery acid is highly corrosive sulfuric acid.

- **Wear safety goggles, user and bystander.**
- **Wear protective gloves.**
- **Make sure someone can hear you or is close enough to provide aid when working near battery.**
- **Have plenty of fresh water and soap nearby. If battery acid contacts skin, clothing or eyes, flush the exposed area with soap and water for 10 minutes. Seek medical help.**
- **Do not touch eyes while working near battery.**

Battery acid can burn eyes and skin.

Grounding, AC Power Cord Connections and General Charger Use

Risk of electric shock and fire.

- **Before connecting power cord to outlet make sure controls are set to OFF.**
- **Do not remove or bypass the grounding pin.**
- **Do not operate charger with damaged cord or plug. Replace cord or plug immediately.**
- **Position power cord and charger cables away from the hood, doors or hot/moving engine parts where they could be damaged.**
- **Use extension cord only when absolutely necessary. An extension cord up to 25 feet must be 18 AWG, up to 50 feet must be 14 AWG, up to 100 feet must be 12 AWG and up to 150 feet must be 10 AWG and extension cord plug and charger plug must have the same number, size and shape of pins.**
- **Unplug power cord using plug rather than cord when disconnecting charger from outlet.**
- **Charger power cord uses equipment-grounding conductor and a grounding plug. Plug only into a three-prong 120 VAC outlet that is correctly installed and grounded in accordance with all ordinances and local codes.**
- **When using an adapter refer to *Figure 1*.**
- **Unplug power cord from outlet before cleaning or maintaining charger. Turning off controls will not reduce this risk.**
- **Do not operate charger after a sharp impact, dropping or any other damage. Do not disassemble charger. Call *Snap-on/Sun* Representative for repairs.**
- **Use only recommended attachments.**
- **Do not charge a frozen battery. Do not overcharge a battery.**
- **Use charger only for lead-acid automotive batteries and for automotive cranking assist using procedure in this manual. Do not use charger for charging dry-cell batteries.**

Electric shock or fire can cause injury.

Refer to *Figure 1.* Use the charger on a nominal 120 VAC circuit that has a grounding outlet that looks like B. An adaptor can be used, such as one like E to connect the plug to a two-pole outlet like C, until a properly grounded outlet can be installed by a qualified electrician.

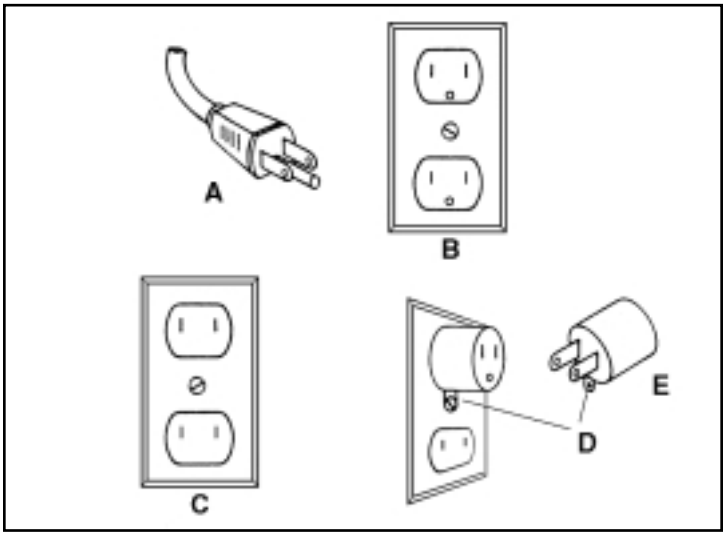

Figure 1: Outlet and Plug Configurations

A – Charger Power Cord Plug
B – Grounded Power Outlet
C – Ungrounded Power Outlet
*D – Green Grounding Lug, must be properly grounded**
E – Grounding Adaptor

*If necessary, replace original outlet cover plate screw with a longer screw that will secure adaptor ear or lug to outlet cover plate, making ground connection to grounded outlet.

Risk of entanglement.
Keep yourself, clothing and battery charger leads clear of moving parts such as fan blades, pulleys, hood, and doors.
Moving parts can cause injury.

Thermal Burns

Risk of burns.
Batteries can produce a short-circuit current high enough to weld jewelry to metal. Remove jewelry such as rings, bracelets and watches before working near batteries.
Short circuits can cause injury.

Charging Instructions

Follow the information in this section to help ensure safety when connecting the charger cables to battery. For additional information refer to *Battery Charging Procedure*.

Battery in Vehicle

Use this information when charging battery in vehicle.

- Do not charge automotive batteries installed in boats. Remove the battery and charge on shore. Onboard charging requires equipment designed for marine use.
- Identify battery terminal polarity.
  - — Negative terminal may be marked NEG, N or –.
  - — Positive terminal may be marked POS, P or +.

✓ The positive terminal is usually larger diameter than the negative terminal on batteries with top terminals.

- Identify system ground.
  - — Negative ground system has negative terminal connected to chassis. This is the most common type.
  - — Positive ground system has positive terminal connected to chassis.

Negative Ground

- Connect positive charger cable clamp—red—to positive battery terminal.
- Connect negative charger cable clamp—black—to vehicle chassis, heavy gauge metal part of frame or engine block, away from battery.

✓ Do not connect the ground clamp to the carburetor, fuel line or body sheet metal.

Positive Ground

- Connect negative charger cable clamp—black—to negative battery terminal.
- Connect positive charger cable clamp—red—to vehicle chassis, heavy gauge metal part of frame, or engine block away from battery.

✓ Do not connect the ground clamp to the carburetor, fuel line or body sheet metal.

Disconnecting Charger

- Turn Length of Charge Timer to OFF,
- Disconnect power cord,
- Remove clamp from ground, and
- Remove clamp from battery terminal.

Battery Not in Vehicle

Follow this procedure when charging battery out of vehicle.

- Identify battery terminal polarity.
  - — Negative terminal may be marked NEG, N or –.
  - — Positive terminal may be marked POS, P or +.

✓ The positive terminal is usually larger diameter than the negative terminal on battery with top terminals.

- Attach at least a 24 inch long 6 gauge (AWG) insulated battery cable to negative terminal.
  - — When charging side terminal battery out of vehicle, use side terminal adaptors.
- Connect positive charger cable clamp—red—to positive battery terminal.
- Position yourself and free end of cable as far away from battery as possible, then connect negative charger cable clamp—black—to free end of cable previously installed. Do not face battery when making final connection.

Disconnecting Charger

- Turn Length of Charge Timer to OFF,
- Disconnect power cord,
- Remove clamp from negative cable, and
- Remove clamp from positive terminal.

✓ Always disconnect charger in reverse sequence of connecting procedure. Stand as far away as possible and face away from the battery when disconnecting ground clamp from cable connection.

BC4200B
Operating Instructions

Use this section for information about using the BC4200B Fast 420 Battery Charger correctly and safely. The following are included.

- Functional Description,
- Battery Charging,
- Maintenance,
- Cranking Assist,
- Assembly, and
- Parts List.

Functional Description

The BC4200B Fast 420 Battery Charger is a constant voltage, taper rate charger. The voltage across the battery remains nearly constant while the charge current decreases or tapers as the battery approaches full charge.

The following information describes control panel features of the charger.

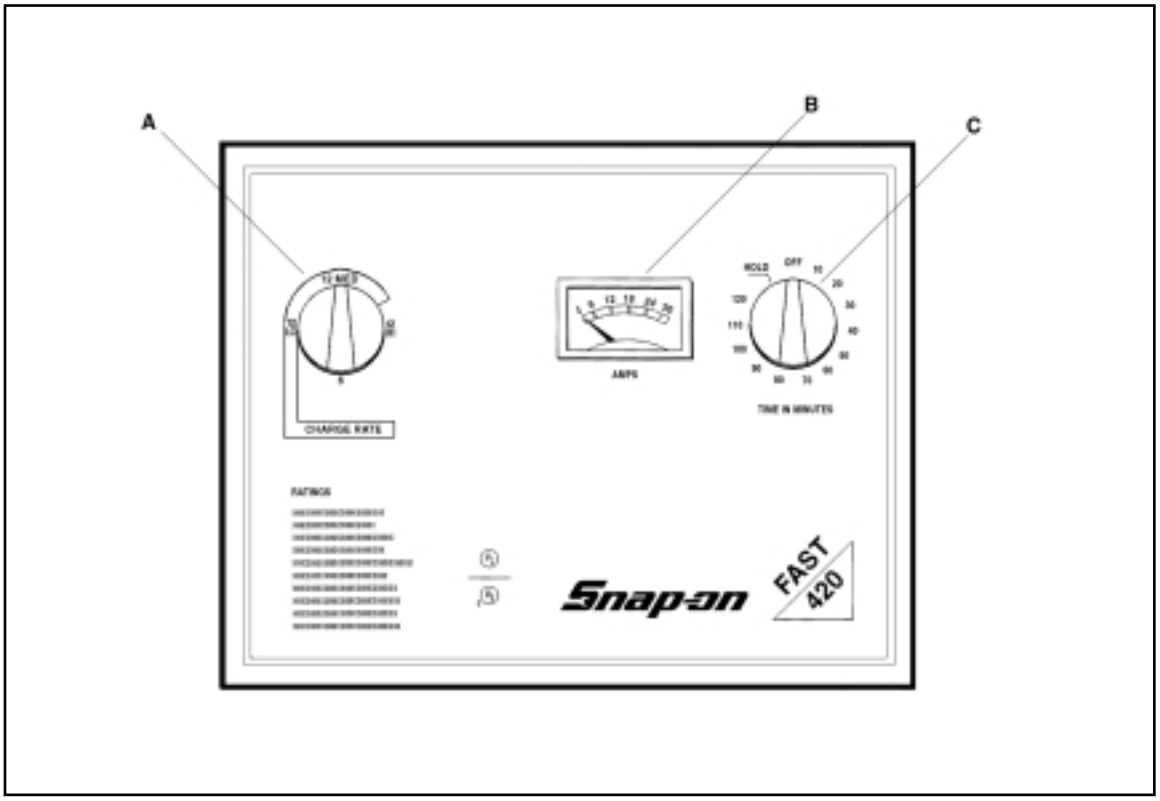

Figure 2: Control Panel

A—Charge Rate Voltage Range Switch

Selects volts for charge. Range settings are:

- — 6,
- — 12LO,
- — 12MED, or
- — 12HI.

B—Ammeter Meter

Displays amps, 0 to 100 ADC, flowing from charger into battery.

C—Length of Charge Timer

Selects charger power mode and charge duration with manual or automatic shut-off functions.

- OFF electrically shuts off power to the charger.
  - — Select before connecting or disconnecting power cord or any leads.
- HOLD powers charger until OFF is manually selected.
  - — Select when desired charge time exceeds 120 minutes. Charger does not turn off automatically when this function is selected.
- CHARGE TIME is number of minutes the charger operates before automatically shut-off. Charger shuts off automatically after number of minutes selected lapse when this function is selected.
  - — Up to 120 minutes can be selected. Increase or decrease charge time as needed by selecting new time.

✓ The charger automatically shuts off when the charge time reaches zero.

Battery Charging Procedure

1. Perform visual inspection of battery(ies) before charging to help prevent personal injury and property damage. Check the following conditions, correcting defects and/or replacing battery(ies) and components as required.
   — Cracked case.
   — Improper electrolyte level - fill to level specified by battery manufacturer.
   — Frozen electrolyte or resulting damage.
   — Loose or corroded terminal/cable connection.
   — Frayed or broken cables.
   — Loose or over-tightened battery hold-down.
   — Correct size and capacity for vehicle.

2. Determine battery voltage from vehicle owner's manual or battery instructions. Use:
   — 6 (6 volt battery),
   — 12LO, 12MED or 12HI (12 volt battery),

3. Measure and record battery state of charge.
   — Specific gravity.
   — Open circuit voltage.

   ✓ State of charge is used in step 9 to determine charge time.

4. Verify AC power cord is disconnected from outlet and Length of Charge Timer is set to OFF.

5. Connect charger cables to battery and power cord to outlet. For additional information refer to *Important Safety Instructions–Charging Instructions*.

- **Never alter AC cord or plug provided. If it will not fit outlet, have proper outlet installed by a qualified electrician.**
- **Read, understand and follow Safety Information in front of this manual.**

6. Set Length of Charge Timer to HOLD.

7. Observe DC AMPS. Some reading should be evident.
   — If OK, allow to stabilize for 5 minutes. Recheck DC AMPS reading.
   — If not, set Length of Charge Timer to OFF. Determine reason for no reading. Correct before proceeding.

8. Determine battery capacity. Capacity is usually marked on battery and rated in:
   — Ampere-Hours (AH),
   — Reserve Capacity (RC), or
   — Cold Cranking Amps (CCA).

   ✓ Battery capacity is used in step 9 to determine charge time.

9. Determine charge time using *Chart 1*.

   ✓ A battery charged 25% or lower may easily freeze, charge immediately.

STATE-OF CHARGE

STATE-OF-CHARGE	100%	75%	50%	25%	DEAD
6 & 12V Specific Gravity	1.260	1.225	1.185	1.140	1.110
12V Open Circuit Voltage	12.6	12.4	12.1	11.9	11.8
6 V Open Circuit Voltage	6.3	6.2	6.1	6.0	5.9

BATTERY CAPACITY

6V			Battery Voltage	12V		
SMALL	MEDIUM	LARGE	**Battery Capacity**	SMALL	MEDIUM	LARGE
100	155	200+	**Ampere hours**	40	60	80+
160	275	430+	**Reserve Capacity**	60	90	100+
500	700	900+	**Cold Cranking Amps**	300	400	500+

LENGTH OF CHARGE TABLE

BATTERY CAPACITY	% CHARGE	BEGINNING AMPS CHARGE RATE					
Small	0-25	45	30	30	25	25	20
	25-50	30	20	20	15	15	10
	50-75	15	10	10	10	5	5
Medium	0-25	70	50	45	40	35	30
	25-50	45	30	25	20	20	20
	50-75	25	15	15	15	10	10
Large	10-25	90	55	55	50	45	45
	25-50	60	40	34	30	30	30
	50-75	30	20	20	15	15	15
APPROXIMATE MINUTES OF CHARGE		**15**	**30**	**45**	**60**	**75**	**90**

Chart 1: Determining Length of Charge using State of Charge and Capacity

Example:

A battery is determined to be medium capacity since its CCA rating is 405 and Reserve Capacity is 90 minutes. Open circuit voltage test shows 12.1 volts, indicating about a 50% charge. Five minutes after the charger is powered up, charging current is 20 amps. Therefore, battery should be charged for 60 to 90 minutes, as shown on the chart.

10. Set required charge time on Length of Charge Timer. If charge time exceeds 120 minutes, perform one of following.
    — Set Length of Charge Timer for any portion of total charge time. Reset timer for remaining time when charge time ends.
    — Reset Length of Charge Timer at any time to extend amount of charge time until total time required is reached.
    — Set Length of Charge Timer to HOLD and manually turn charger off when required time is reached. Charger does not turn off automatically. Overcharging can damage battery.

11. Periodically monitor state of charge to prevent overcharging, especially near end of charge period.

    Battery is completely charged when specific gravity and/or charging voltage do not increase after two hours.

Charging More than One Battery

Passenger vehicles and light trucks with diesel engines may use two batteries. Heavy-duty trucks, special service vehicles, some agricultural and industrial equipment may use two or more batteries. Charge multiple batteries up to 12 volts.

Batteries may be charged in a group if:

- Wired in parallel with the positive terminal of one battery connected to the positive terminal of the remaining battery(ies) and the negative terminals connected to negative terminals.

  ✓ Charging time is twice as long for a group of batteries wired in parallel as a single battery.

- Wired in series with the positive terminal connected to negative terminal between batteries; and the voltage of all batteries combined is 12 volts, i.e. two 6 volt batteries.

  ✓ If one battery of a parallel or series group is charged and another is discharged, isolate the battery(ies) and charge separately.

Cranking Assist

Use this procedure to help the battery crank the engine over in a vehicle with a discharged battery.

- Use only on batteries in good condition.
- Do not use if the battery has been discharged for a long period of time, since it may be sulfated.

1. Turn off all accessories and lights.

2. Connect clamps to battery terminals. For additional information refer to *Safety Information–Charging Instructions*.

3. Plug charger power cord into properly grounded 120 VAC outlet.

4. Set Length of Charge Timer to HOLD.

5. Charge battery for five minutes.

   ✓ Partially charging battery helps direct more power to starter motor during cranking assist.

6. Crank engine.

   ✓ Cranking assist is provided for approximately 5 seconds followed by a 120 second cool down. Although most starter motors can withstand cranking for 15 seconds, the charger only provides cranking assist for 5 seconds before cool down is required.

Maintenance

- **Unplug power cord from outlet before cleaning or maintaining charger. Turning off controls will not reduce this risk.**
- **Read, understand and follow Safety Information in the front of this manual.**

Clean the case using a mild detergent. Do not allow liquid to drip into the case.

Do not remove the case to perform routine maintenance. Worn parts can compromise safety and charger performance.

Replace parts as needed. For service, contact your sales representative.

Assembly Instructions

Use the following instructions to properly assemble battery charger before use.

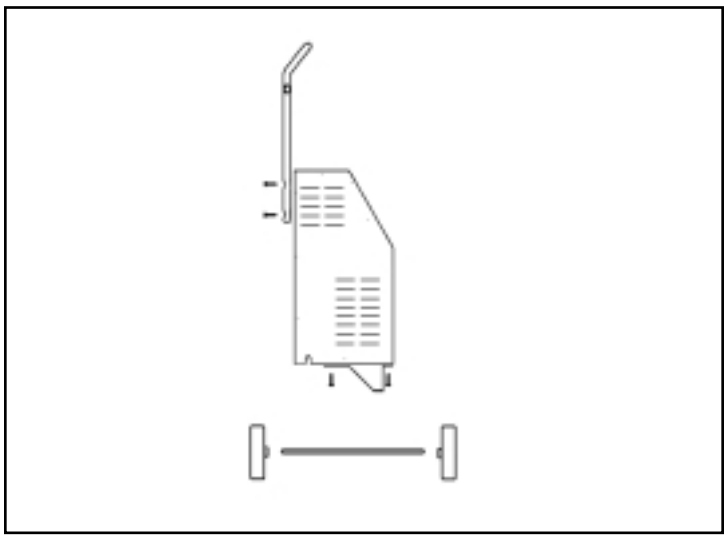

Figure 3: Assembly Diagram—Power Cord and Cables Not Shown

1. Attach handle to charger with two screws provided.
2. Attach crossbar to handle with two screws provided.
3. Attach floor brackets to base with hex head screws provided.
4. Slide wheel onto axle with hub toward charger, then slide axle through charger base.
5. Place remaining wheel on axle and tap retainer nuts onto axle.

Parts List

Description	Part Number
Rectifier Assembly	BC4200-2000R
Transformer Assembly	BC4200-7000R
Fan Blade	2-1268
Fan Motor	2-10166-1
DC Leads with Clamps	BC4200-100R
DC Circuit Breaker	2-15366
AC Circuit Breaker	2-10266
Ammeter	4-280
Power Cord	BC4200-6
Rotary Voltage Range Switch	2-13659
Charge Timer	2-14866
Knob, Charge Timer or Voltage Range	8-8230
Handle with Hardware	EAK0073K20A
Includes handle, crossbar and 6 screws	
Foot with 4 screws	EAK0073K23A
Wheel Kit	EAK0073K26A
Includes 2 wheels, 2 push nuts and axle	

Wiring Diagram

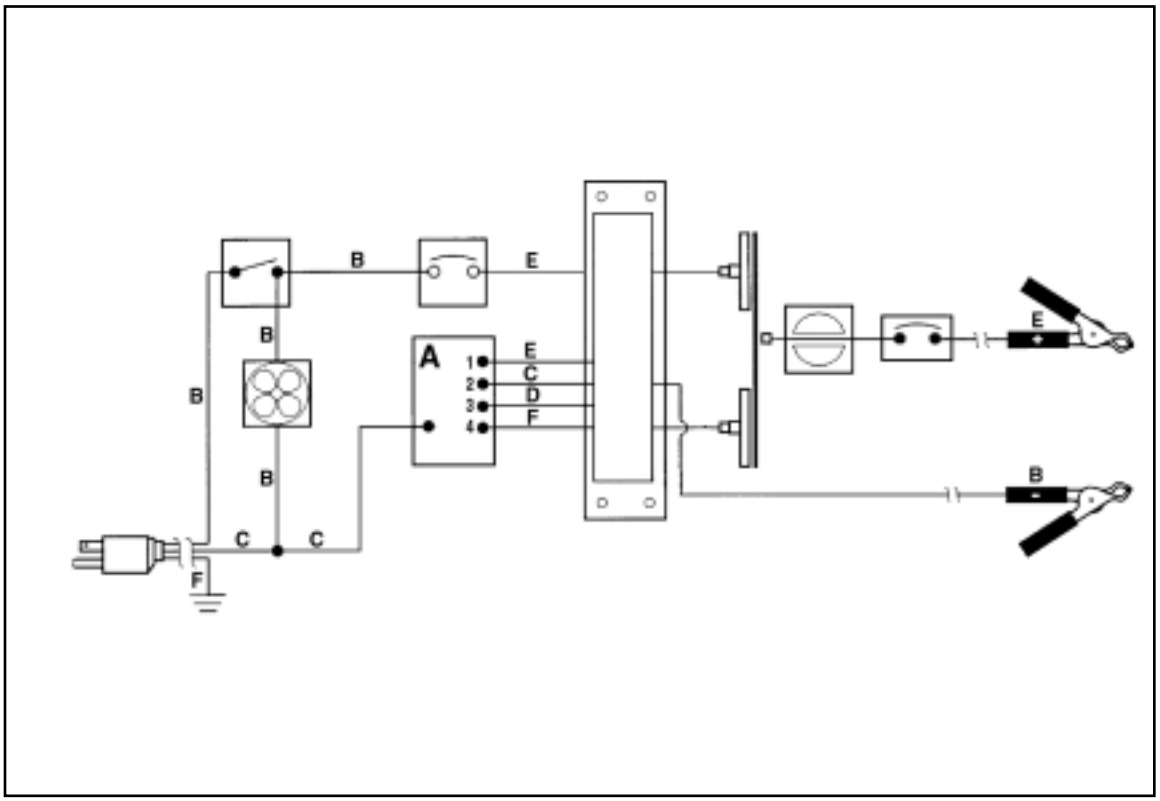

Figure 4: Wiring Diagram, BC4200B Fast 420 Battery Charger

A – Charge Rate
B – Black
C – White
D – Blue
E – Red
F – Green

SAVE THESE INSTRUCTIONS

Snap-on Fast 420 Battery Charger Limited Warranty

Limited Warranty. Snap-on Tools Company warrants only to the original Buyer that under normal use, care and service, the Battery Charger shall be free from defects in material and workmanship for (1) year from the date of original invoice (except as otherwise provided herein). The transformer and rectifier warranty period is (5) years from the date of original invoice.

This Warranty does not cover (and separate charges for parts, labor and related expenses shall apply to) any damage to, malfunctioning, inoperability or improper operation of the Battery Charger caused by, resulting from or attributable to (A) abuse, misuse or tampering; (B) alteration, modification or adjustment of the Battery Charger by other than authorized representatives of Snap-on; (C) repair or maintenance (other than specified operator maintenance) of the Battery Charger or related equipment, attachments, peripherals or optional features by other than authorized representatives of Snap-on; (D) improper or negligent use, application, operation, care, cleaning, storage or handling; (E) fire, water, wind, lightning or other natural causes; or (F) adverse environmental conditions, including, without limitation, excessive heat, moisture, corrosive elements, or dust or other air contaminants; radio frequency interference; electric power failure; power line voltages beyond those specified for the Battery Charger; unusual physical, electrical or electro-magnetic stress; and/or any other condition outside of environmental specifications of Snap-on.

NO OTHER WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, SHALL APPLY, AND ALL SUCH WARRANTIES ARE HEREBY EXPRESSLY EXCLUDED.

The obligations of Snap-on under this warranty are limited solely to the repair or, at the option of Snap-on, replacement of or refund of the original purchase price for, Battery Charger or parts which to the satisfaction of Snap-on are determined to be defective and which are necessary, in the judgment of Snap-on, to return the Battery Charger to good operating condition. Repairs or replacements qualifying under this Warranty will be performed or made on regular business days during normal working hours of Snap-on within a reasonable time following Buyer's request. All requests for warranty service must be made during the stated warranty period.

Limitation of Liability. In no event shall Snap-on be liable to Buyer or anyone claiming through or against Buyer for any special, indirect or consequential damages (including, without limitation, lost profits, revenues, anticipated sales, business opportunities or goodwill; interruption of business; or loss of business information) resulting from or arising out of (a) negligence; (b) any breach or non-performance of this agreement or any duties, obligations, responsibilities, representations or warranties hereunder; (c) the delivery, installation, operation, performance, use or maintenance (or non-performance, delay in or failure) of the Battery Charger, or services to be provided hereunder; or (d) otherwise, even if Snap-on has been advised of the possibility of such damages.

The entire liability of Snap-on for damages to Buyer resulting from or arising out of the performance or non-performance of this Agreement or for any cause whatsoever, and regardless of the form of action, whether in contract or in tort (including negligence or strict liability) or any other legal theory, shall not exceed the purchase price for the specific item(s) of Battery Charger found to be defective. Buyer assumes full responsibility for the overall operating environment in which the Battery Charger is to function, including, without limitation, temperature, humidity, corrosive elements, and dust or other air contaminants.

For further information contact:
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